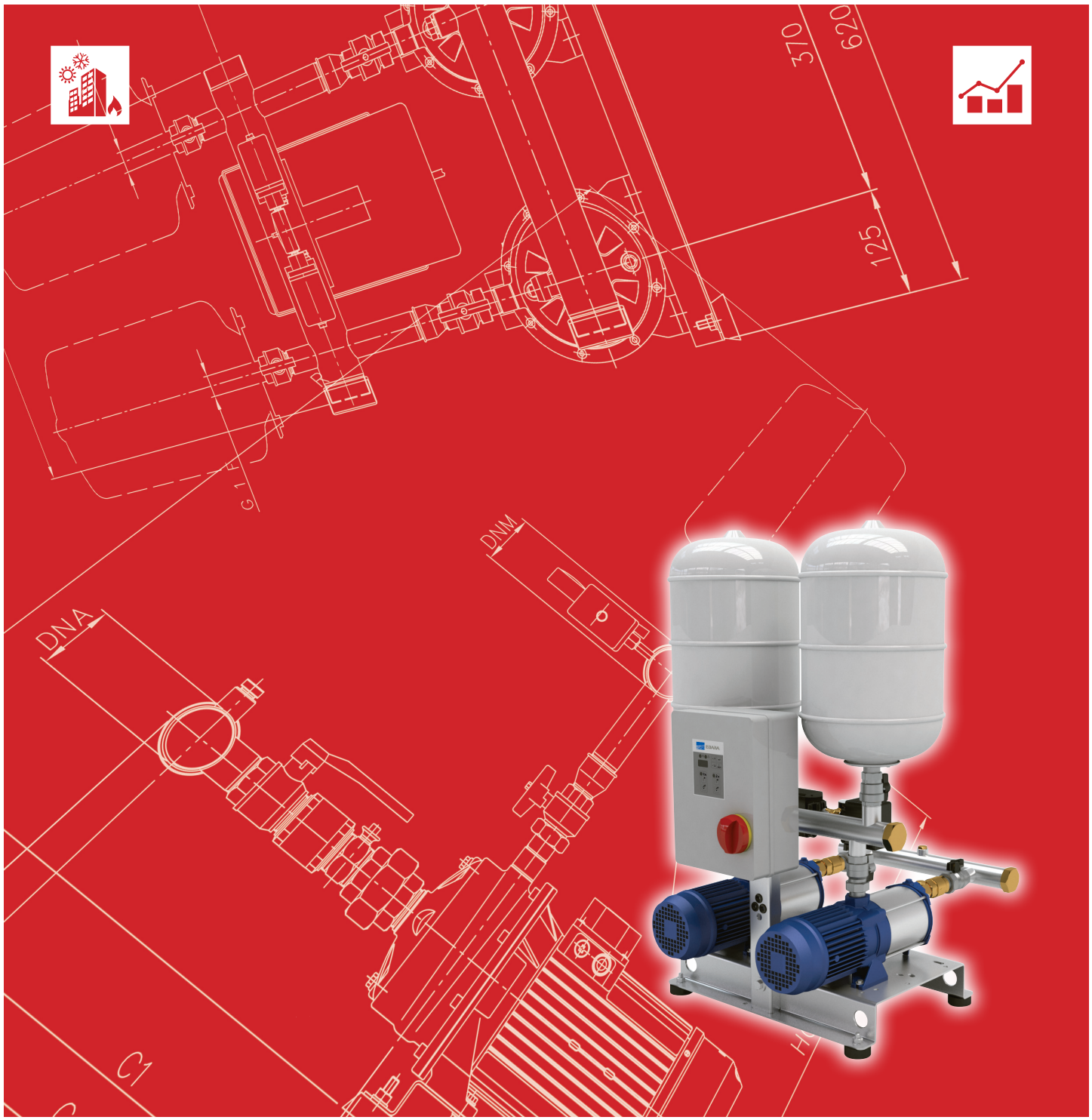




Japanese Technology since 1912

COMPACT Booster Sets

Data Book 50Hz



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DEFINITION AND USE OF PRESSURISATION UNITS

In situations in which a municipal water mains is lacking or insufficient for the proper operation of the services, one must install a pressurization unit to provide acceptable pressure and flow rates to even in the most unfavourable services. Pressurisation units are used wherever there is a need to increase the pressure, or to pressurise a water circuit. **EBARA GP pressurisation units** are automatic systems with 2 or more pumps operating in parallel, designed to provide a simple and reliable solution to the most common requirements for maintenance of water supply pressure for apartment buildings, hotels, centres, offices and schools as well as providing auxiliary service in industrial and agricultural applications. They stand out for their robust construction, compact size, excellent efficiency and silent operation. GP units are equipped for connection to membrane and air cushion autoclaves. They are controlled by pressure switches or, for units with INVERTER control, by the signal from a pressure transmitter.

TYPICAL APPLICATIONS

INDUSTRY	BUILDING SERVICE	WATER SUPPLY
		

PRINCIPLE OF OPERATION OF GP PRESSURISATION UNITS

When water is demanded, it is first drawn from the autoclave tank (if present). This demand for water, with the pumps stopped, lowers the pressure until the pressure transmitter starts the first electropump. If the output flow is greater than the delivery capacity of a single pump, the pressure continues falling until the pressure transmitter, thus starting the second pump. This happens for all pumps in the unit. When the water demand stops or reduces, the system pressure rises, the pressure transmitter shutting off the pumps one by one. This is done in inverse order to that in which the motors were started up, the number of hourly starts per pump is reduced and they are all used to the same extent

NB: By connecting a float switch or minimum pressure switch to the control panel (both for demand from the first accumulation tank and from the water circuit itself) one can prevent the most frequent cause of pump failure: dry running

PRINCIPLE OF OPERATION OF GPE PRESSURISATION UNITS

GPE units are designed to operate with a pump controlled by an **INVERTER** in the control panel, on board the motor, or in-line. The unit thus maintains constant pressure in the water circuit.

There are various versions of GPE unit:

- With INVERTER in the control panel (Standard **EFC** version)
With a single INVERTER controlling a single pump which is alternated with the others at each start up (MFC version, on request, in which each pump is INVERTER controlled).
- With multiple INVERTERS, each pump controlled by its own INVERTER (**MFC versions**, versions with INVERTER on board motor or in-line INVERTER)

Note: Not all control options shown in the introduction are available with Compact pumps

OPERATING CONDITIONS

EBARA GP-GPE pressurisation units can be used, in their standard versions, for civil, industrial and agricultural applications, as follows:

- building service
- water lifting and handling
- A/C
- heating
- irrigation
- washing systems

The conveyed fluid must be: clean, potable, ground or mixed water, free of solid or fibrous suspensions and aggressive chemical substances.

The units must be installed under cover, protected from the weather and freezing.

- Conveyed water temperature 0 - 50°C (depending on pumps).
- Ambient operating temperature 0 - 40°C, no higher than 1000 m above sea level.
- Max relative humidity 50% at +40°C.

NB: The system available NPSH must be greater than the NPSH demanded from the pump. For applications with different technical specifications, uses and climatic conditions (type of vector fluid, marine and aggressive industrial conditions), please contact our sales network.

TESTS AND TRIALS

Before shipping, all EBARA pressurisation units are subject to hydraulic, mechanical and electrical testing.

MECHANICAL AND HYDRAULIC TESTS

- Pressure switch calibration
- Pump direction of rotation
- Mechanical testing of moving parts and running noise (on each pump)
- Tightness test with delivery port closed and nameplate rating tests
- MANUAL trials (using button on control panel) for each pump
- AUTOMATIC trials (using switch on control panel) for unit

ELECTRICAL TESTS

- Earthing system continuity
- Applied voltage (dielectric rigidity)
- Insulation resistance

Principle of Operation of GPE Pressurisation UNITS with E-drive and E-SPD

GPE units with E-drive and E-SPD are designed to operate with each pumps controlled by an INVERTER installed on board its motor, E-drive up the fan cover, E-SPD on the terminal box. The system is controlled by an MASTER INVERTER in relation to the reference signal supply by a pressure transmitters (4 - 20 mA passive). As the system pressure varies, the MASTER pump varies its rotary speed to restore it to the setpoint. If the water demand exceeds the capacity of the pump, the second variable speed pump cuts in and, pump goes into regulation mode to maintain the pressure setpoint; this happens for all the pumps in the unit. If the water demand drops off, the pressure tends to increase and the latest pump gradually reduces its speed to restore the correct operating pressure. This results in the regulation of the speed of the other pumps, until they gradually turn off. Once the system pressure has been restored and the water demand is 0, the MASTER pump switches off automatically.

Principle of Operation of GPE Pressurisation UNITS with E-power and Hydrocontroller

GPE units with E-power and Hydrocontroller are two pumps unit and are designed to operate with pumps controlled by an INVERTER in-line type. As the system pressure varies, the MASTER pump varies its rotary speed to restore it to the setpoint. If the water demand exceeds the capacity of the pump, the second variable speed pump cuts in and, the two pumps rotate at variable synchronous speed to restore the operating pressure. If the water demand drops off, the pressure tends to increase and both pumps gradually reduces its speed to

restore the correct operating pressure. This results in the regulation of the speed of the other pumps, until they gradually turn off when the water demand is 0.

Principle of Operation of GPE Pressurisation UNITS with an EFC control panel

EFC multiple pump control units power pump n. 1 with the INVERTER to modulate system performance in relation to the reference signal while the other pumps are run at maximum nominal speed (around 2900 rpm) and started and stopped in relation to demand. These means there are two distinct primary electrical circuits:

- n. 1 - INVERTER startup/control of a single pump,
- n. 2 - contactor startup (direct or star/delta) of the other pumps.

The system is controlled by an electronic controller in relation to the reference signal supply by a pressure transmitter, flow meter or other unified control signal (4 - 20 mA passive).

If the electronic controller or pressure transmitter fails, a system of pressure switches controls the pumps directly (if present).

- In case of water distribution at constant pressure (Fig.1), the electronic controller is connected to the pressure transmitter on the units' delivery manifold, which outputs a signal proportional to the circuit pressure. When the pressure drops due to water demand, the pressure transmitter signal also drops and the controller starts and controls the speed of the first pump with the INVERTER to restore the reference/ operating pressure. If the pump's flow rate is lower than demand, the circuit pressure will continue to drop and the system responds by increasing the pump's speed. Once pump n. 1 reaches its maximum speed and demand is still in excess of its delivery, the controller will start pump n. 2 at maximum speed. The speed of pump n. 1 is immediately modulated so as to establish the operating pressure. If the pressure drops even further and pump n. 1 is once again running at maximum speed, the controller starts up pump n. 3, and so on for all pumps in the unit. If the water demand drops off, the pressure tends to increase and the controller reduces the speed of pump n. 1 to restore the correct operating pressure. At this point, the controller will stop one of the pumps running at maximum speed, while the speed of pump n. 1 is modulated to maintain the reference pressure. As the pressure continues to increase due to reduced demand, once the minimum speed of pump n. 1 is reached once more the controller will stop pump n. 3 and then pump n. 2. Once the demand for water has completely ceased, the controller reduces the speed of pump n. 1 to its minimum and after a set delay (around 1 minute) stops this pump too. The next time the system is started up, the INVERTER controlled pump will no longer be pump n. 1, but n. 2. The INVERTER controlled pump thus rotates through all pumps in sequence.

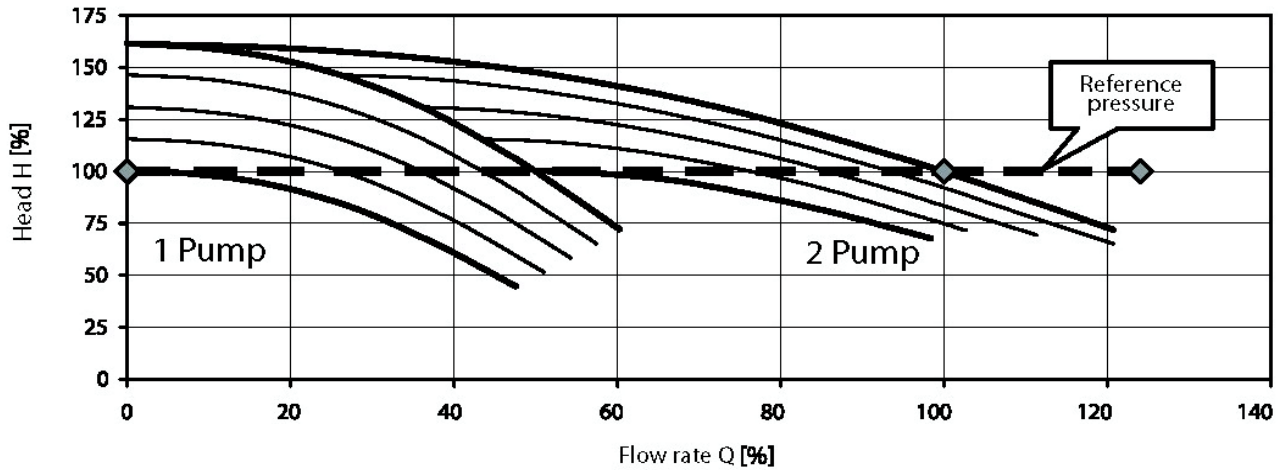
Principle of Operation of GPE Pressurisation UNITS with an MFC control panel

MFC multiple pump control panels power each pump with an INVERTER to modulate system performance in relation to the reference signal. MFC controllers differ from EFC controller from the point of view of their construction, since instead of having a single INVERTER to control all the pumps, each pump has its own INVERTER. The two types of control panel differ in construction, but they have the same type of operation by the controller, which responds to the reference signal output by a pressure transmitter or other unified control (4 - 20 mA passive). If the electronic controller or pressure transmitter fails, a system of pressure switches controls the INVERTERS directly.

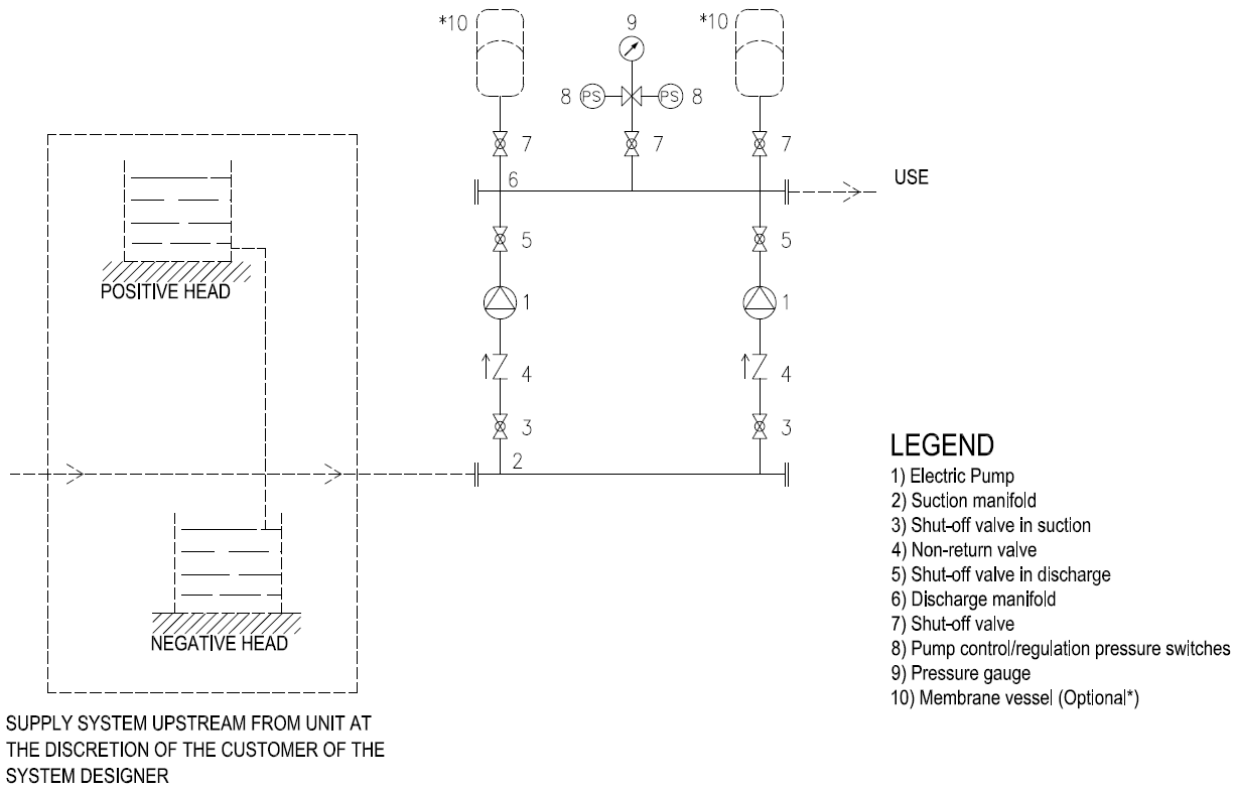
- In case of water distribution at constant starting pressure (Fig.1), the electronic controller is connected to the pressure transmitter on the units' delivery manifold, which outputs a signal proportional to the circuit pressure. When the pressure drops due to water demand, the pressure transmitter signal also drops and the controller starts and controls the speed of the first pump with the INVERTER to restore the reference/ operating pressure. If the pump's flow rate is lower than demand, the circuit pressure will continue to drop and the system responds by increasing the pump's speed. Once pump n. 1 reaches its maximum speed and demand is still in excess of its delivery, the controller will start pump n. 2, also at variable synchronous speed. The controller will modulate the speed of the two pumps to restore the operating pressure; the modulating frequency is the same for both pumps. If the pressure drops even further and pumps n. 1 and 2 are once again running at maximum speed, the controller starts up pump n. 3, and then pump n. 4, if present. When the water demand is reduced the pressure will end to increase, as does the pressure transmitter output value. The controller thus reduces the speed of pumps n. 1, 2, 3 and 4 (they are all controlled at the same speed) to restore the reference/ operating pressure. If the pumps' flow rate is greater than demand, the circuit pressure will continue to increase and the system responds by decreasing the speed of the pumps until it reaches the minimum speed setting. At this point, the controller will stop pump n. 4, while the speed of pumps n. 1, 2 and 3 is modulated to maintain the reference pressure. As the pressure continues to increase due to reduced demand, once the minimum speed setting is

reached again, the controller will stop pump n. 3 and modulate the speed of pumps n. 1 and 2. This continues in sequence as the demand continues to fall, until the unit is completely stopped.

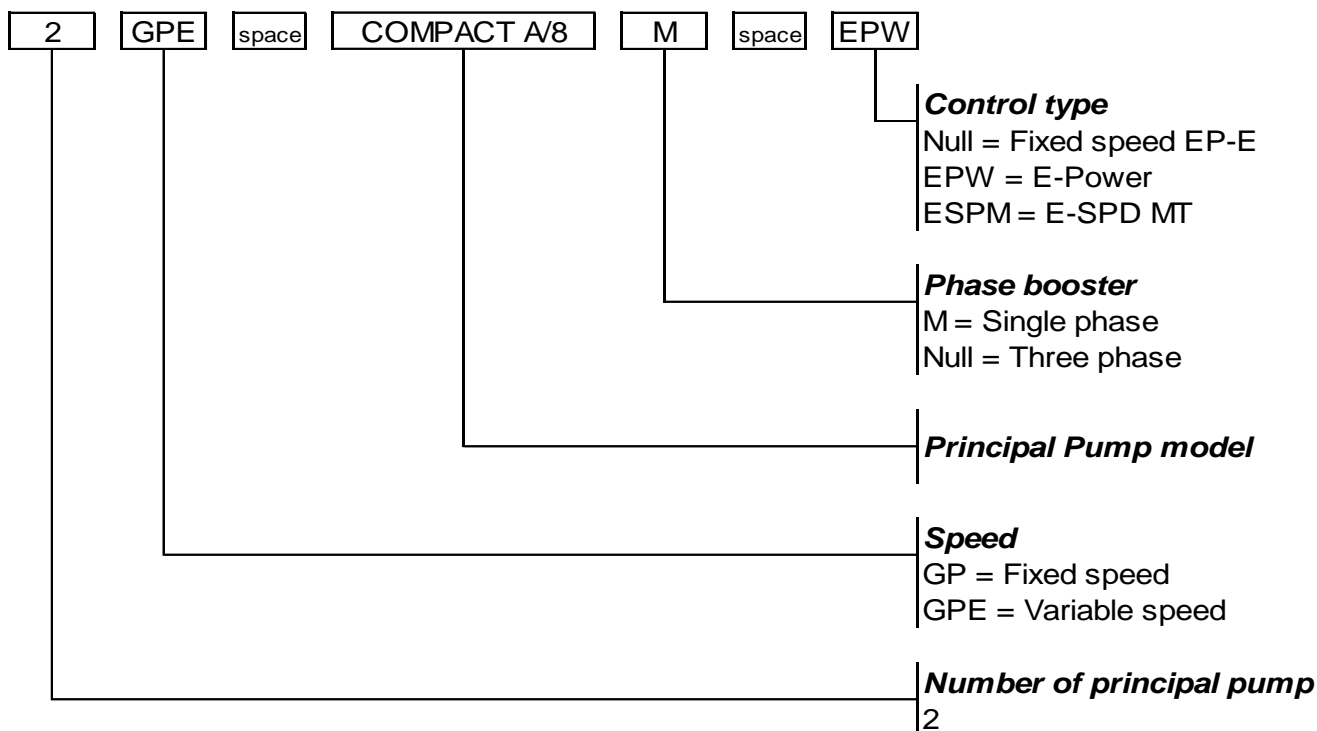
Fig. 1 - TWO PUMP UNIT WITH CONSTANT PRESSURE REGULATION





PRESSURISATION UNIT WATER CIRCUIT DIAGRAM



TYPE KEY 2GP(E) COMPACT



NAME PLATE

 EBARA Via Campo Sportivo, 30 38023 CLES (TN) ITALY		 MADE IN ITALY
BOOSTER UNIT		
TYPE	①	
P/N	②	
S/N	③	

- 1) "TYPE" booster model
- 2) "P/N" booster item number
- 3) "S/N" booster serial number

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PRODUCT SPECIFICATIONS HYDRAULIC COMPONENTS AND CONTROL

BOOSTER SET					
COMPACT					
Operating range	Version		A	B	
	Nominal flow rate (m ³ /h)	Single pump		4.8	7.2
		2GP(E)		9.6	14.4
	Maximum working pressure		10 bar		
	Liquid temperature range		5÷40°C		
	Ambient operating temperature (no higher than 1000 m above sea level)		0÷40°C		
Hydraulic components	Frame		Omega sheet Galvanized steel		
	Manifold suction / discharge		Threaded manifold AISI 304		
	Closing manifold		Threaded female cap Brass		
	Check valve		Threaded check valve Brass / NBR		
	Ball valve		Threaded ball valve Brass / PTFE		
	Socket for air feeders (only for "GP" version)		Threaded socket Brass		
Control	Pressure gauge		M3A-ABS 50/FR / plastic-copper alloy		
	Pressure transmitter		GP version and GPE version with E-SPD EN 10088-1.4301 (AISI 304) / 1.4404 (AISI 316L)		

ELECTRIC PANEL

BOOSTER SET					
COMPACT					
Operating range	Version		A	B	
	Nominal flow rate (m ³ /h)	Single pump		4.8	7.2
		2GP(E)		9.6	14.4
Control panel	Principal Electric panel	EP-E fixed speed (only for GP)	●	●	
		SP EFC/MFC variable speed (only for GPE)	○	○	
	E-power (EPW)	single-phase supply inverter (only for GPE)	●	●	
	E-SPD [1]	ESPDM single-phase supply inverter (only for GPE)	●	●	
		ESPDT three-phase supply inverter (only for GPE)	●	●	

● : Standard ○ : Optional

[1] To be assemble with protection panel (to see "PROTECTION PANEL" section)

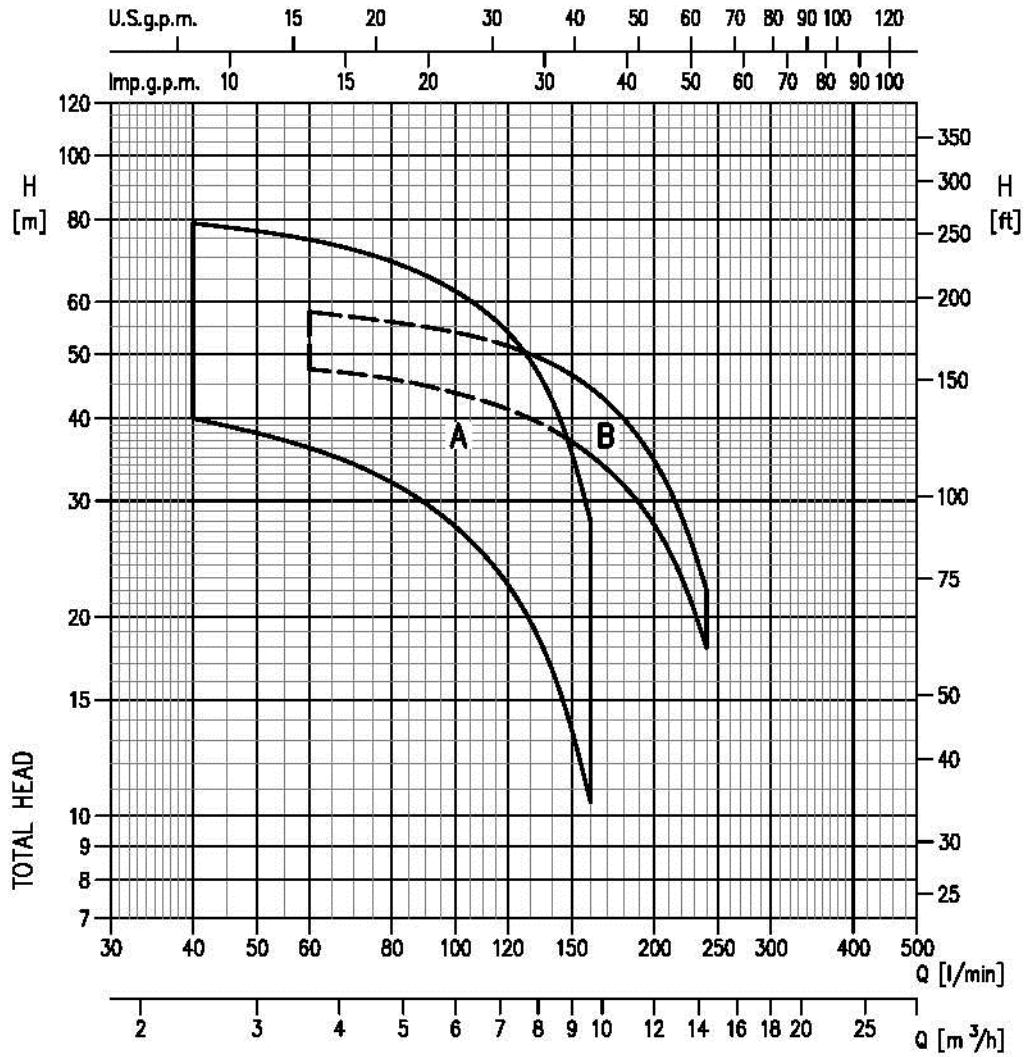
TECHNICAL PUMP DATA

PUMP			
COMPACT			
Operating range	Version	A	B
	Maximum working pressure	1 MPa (10 bar)	
	Liquid temperature range	+5°C to +40°C	
Liquid handled	Liquid type	Clean water	
Key components material	Casing	Cast iron	
	Impeller	PPE+PS Glass fiber reinforced	
	Shaft seal	Ceramic/Carbon/NBR	
	Shaft	AISI 416	
	Bracket	Cast iron	
	Diffuser	PPE+PS Glass fiber reinforced	
Pipe connection	Suction	G 1"	G 1 " ¼
		UNI ISO 228	
	Discharge	G 1" UNI ISO 228	

TECHNICAL MOTOR DATA

MOTOR				
COMPACT				
Power source	Frequency	50 Hz		
	Phase	Single-phase	Three-phase	
	Rotation speed	2800 min ⁻¹		
	Power rating	0.6 ÷ 1.1 kW	0.6 ÷ 1.1 kW	
		0.8 ÷ 1.5 HP	0.8 ÷ 1.5 HP	
Voltage	230 ± 10% V	230/400 ± 10%		
Type	Type	Electric - TEFC		
	Efficiency level	-	0.6 kW IE3 from 0.75 kW up to 1.1 kW	
	N° of poles	2		
	Protection degree	IP 44		
	Insulation class	F		
Others	Capacitor	Built in	-	
	Overload protection	Built in	Provided by the user	
	Casing Material	Aluminium		
	Motor support	Cast iron		

PERFORMANCE RANGE RESEAU BOOSTER SET 2GP(E) COMPACT



50Hz

PERFORMANCE RANGE

GP-GPE

3

PERFORMANCE RANGE

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CURVE SPECIFICATION 2GP(E)

The specifications below qualify the curves shown on the following pages.

Tolerances according to ISO 9906 Annex A

The curves refer to effective speed of asynchronous motors at 50 Hz

Measurements were carried out with clean water at 20°C of temperature and with a kinematic viscosity of $\nu = 1 \text{ mm}^2/\text{s}$ (1 cSt)

The NPSH curve is an average curve obtained in the same conditions of performance curves.

The continuous curves indicate the recommended working range. The dotted curve is only a guide.

In order to avoid the risk of over-heating, the pumps should not be used at a flow rate below 10% of best efficiency point.

Symbols explanation:

Q = volume flow rate

H = total head

P2 = pump power input (shaft power)

η = pump efficiency

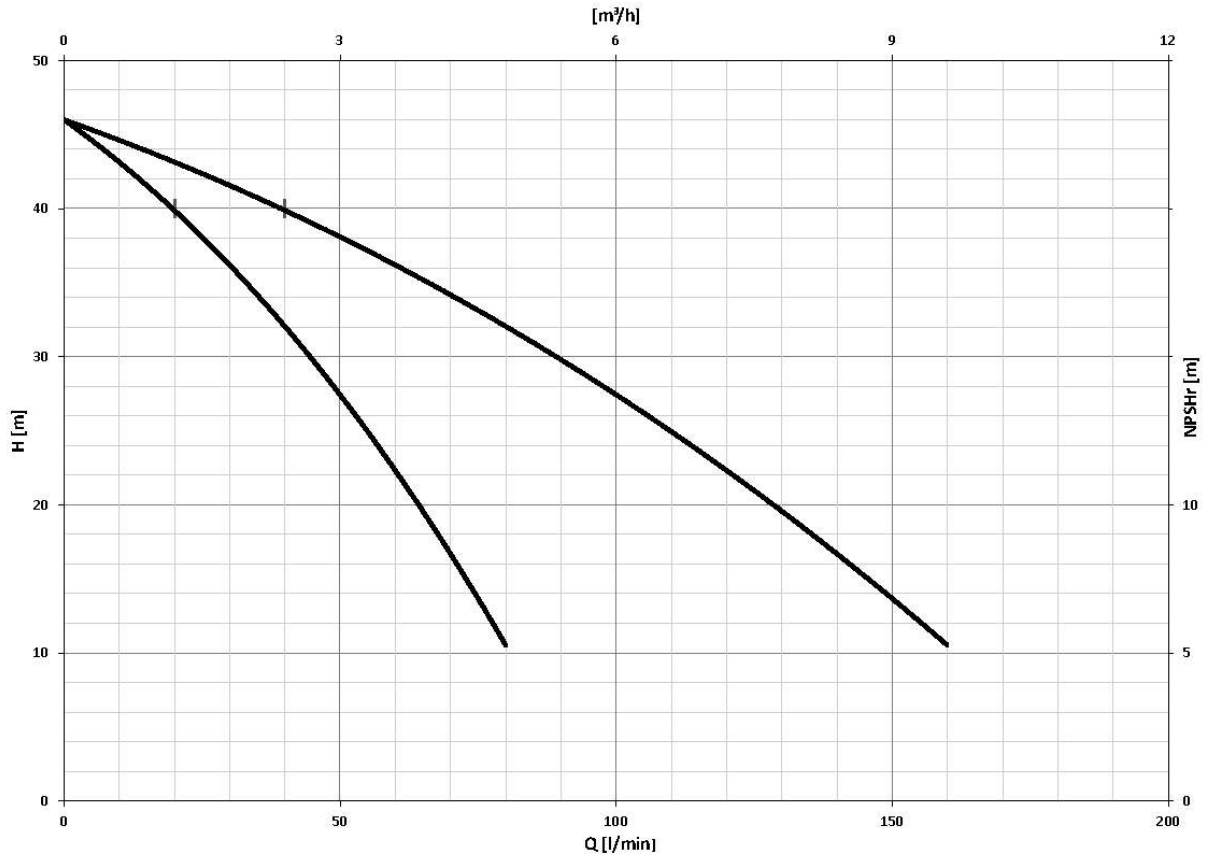
NPSH = net positive suction head required by the pump

SELECTION CHART 2GP(E) COMPACT

Model	Supply		Motor		Maximum working pressure (MPa)	Q=Capacity									
	Single phase	Three phase	kW	HP		l/min	0	40	60	80	100	120	160	200	240
						m ³ /h	0	2.4	3.6	4.8	6.0	7.2	9.6	12.0	14.4
H=Total manometric head in meters															
2GP(E) COMPACT A/8(M)	●	●	0.6+0.6	0.8+0.8	0.8	46.0	39.7	36.1	32.0	27.4	22.4	10.5	-	-	
2GP(E) COMPACT A/10(M)	●	●	0.75+0.75	1+1		62.0	56.5	53.0	48.5	43.5	37.1	20.0	-	-	
2GP(E) COMPACT A/12(M)	●	●	0.9+0.9	1.2+1.2		74.0	67.5	63.5	58.5	52.5	45.0	24.0	-	-	
2GP(E) COMPACT A/15(M)	●	●	1.1+1.1	1.5+1.5		86.0	79.0	74.5	69.0	62.5	54.0	28.0	-	-	
2GP(E) COMPACT B/12(M)	●	●	0.9+0.9	1.2+1.2	0.6	51.0	-	47.5	46.0	43.5	41.5	35.2	27.6	18.0	
2GP(E) COMPACT B/15(M)	●	●	1.1+1.1	1.5+1.5		63.0	-	58.0	56.0	54.0	51.5	44.5	34.5	22.0	

● : Standard ○ : On request

PERFORMANCE CURVE 2GP(E) 2GP(E) COMPACT A/8(M)



50_{Hz}

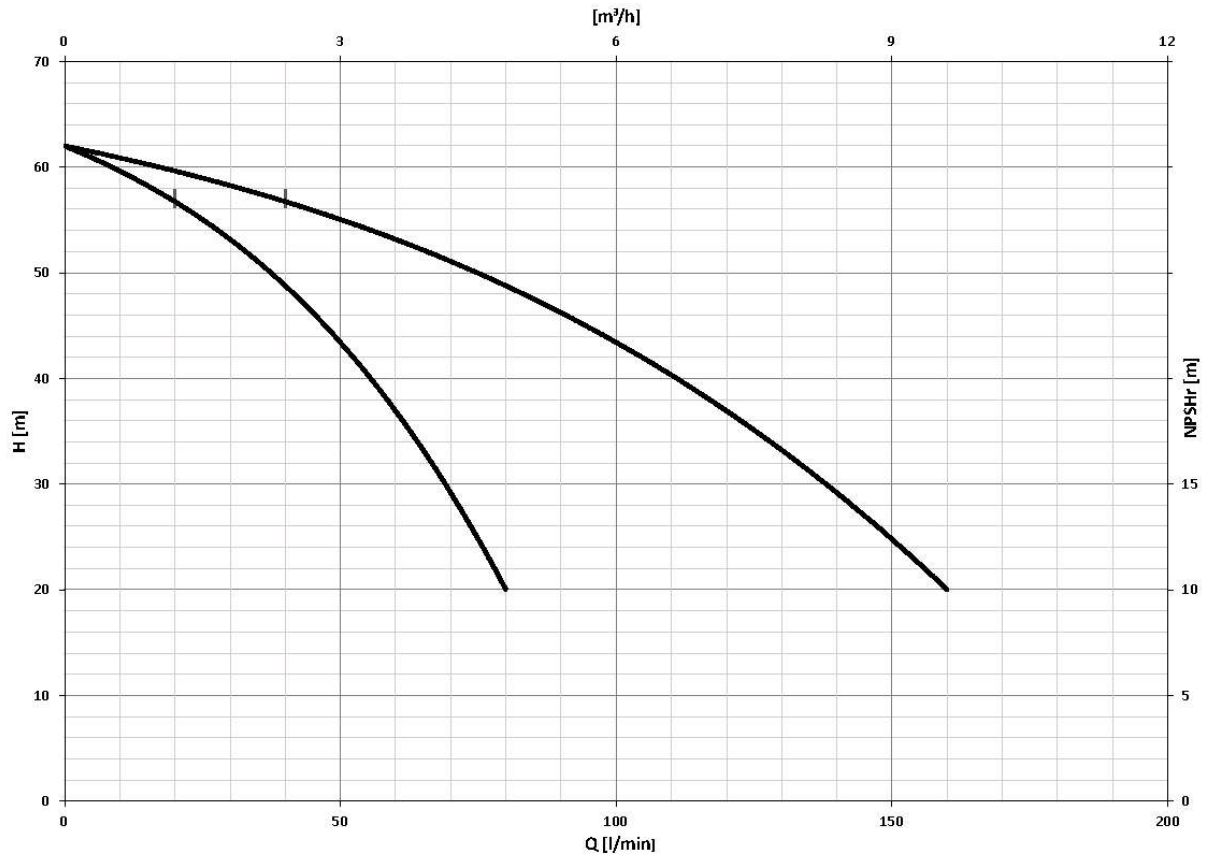
PERFORMANCE CURVE

GP-GPE

5

2GP(E) COMPACT A/10(M)

PERFORMANCE CURVE



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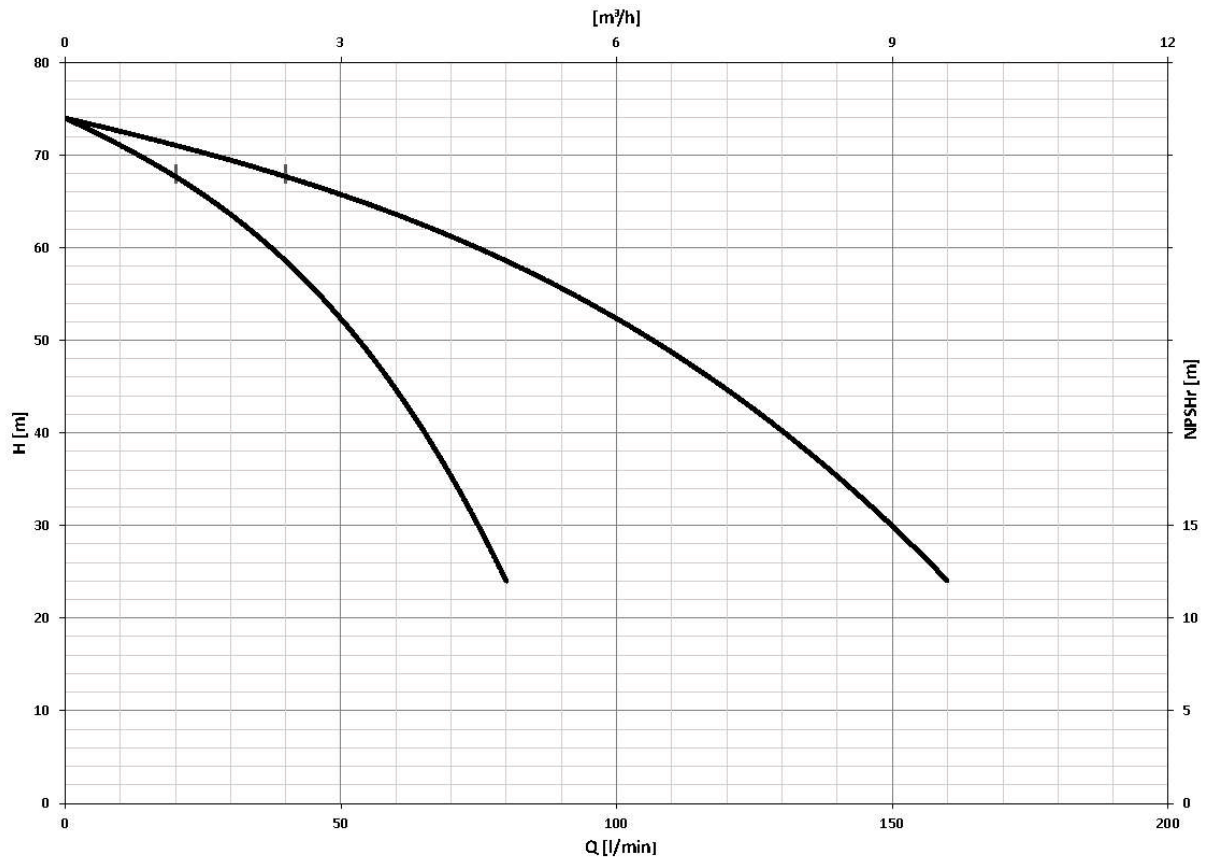
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2GP(E) COMPACT A/12(M)

5



PERFORMANCE CURVE

50_{Hz}

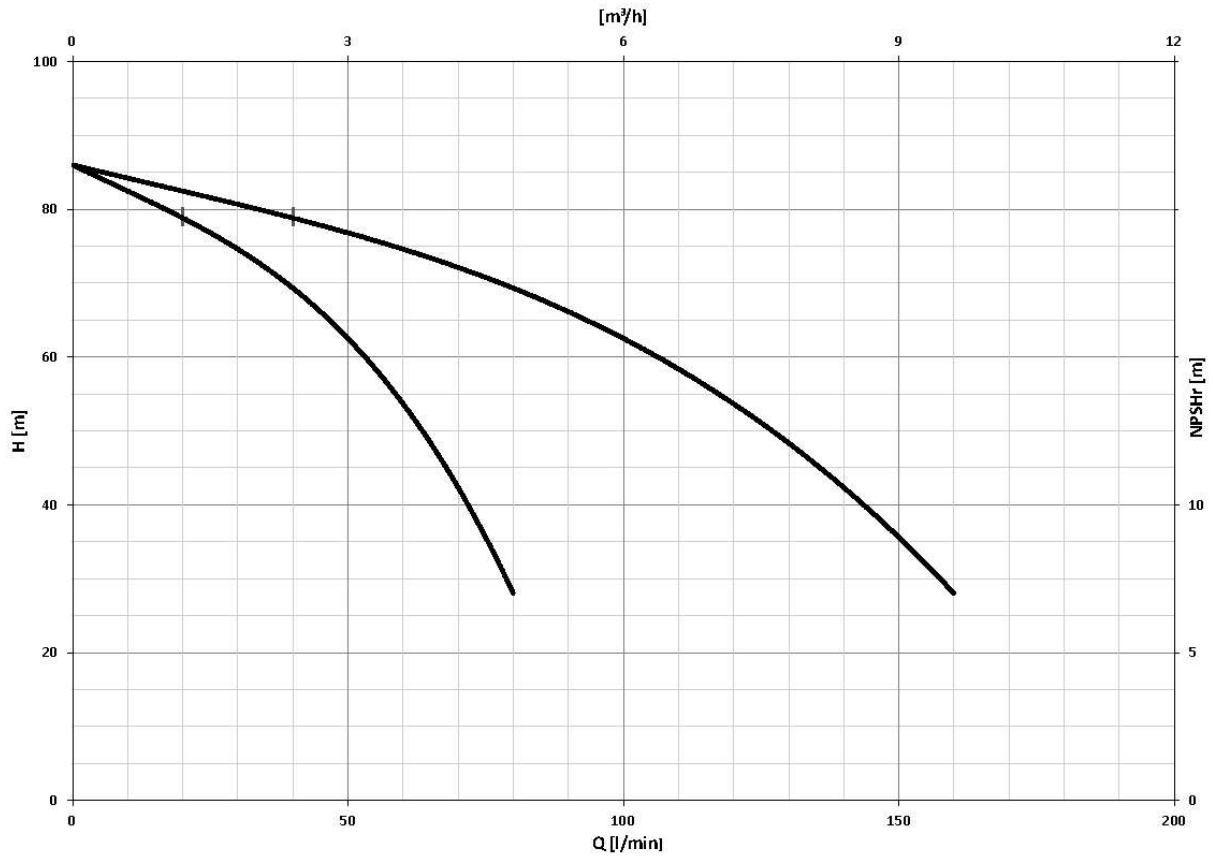
PERFORMANCE CURVE

GP-GPE

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2GP(E) COMPACT A/15(M)

PERFORMANCE CURVE



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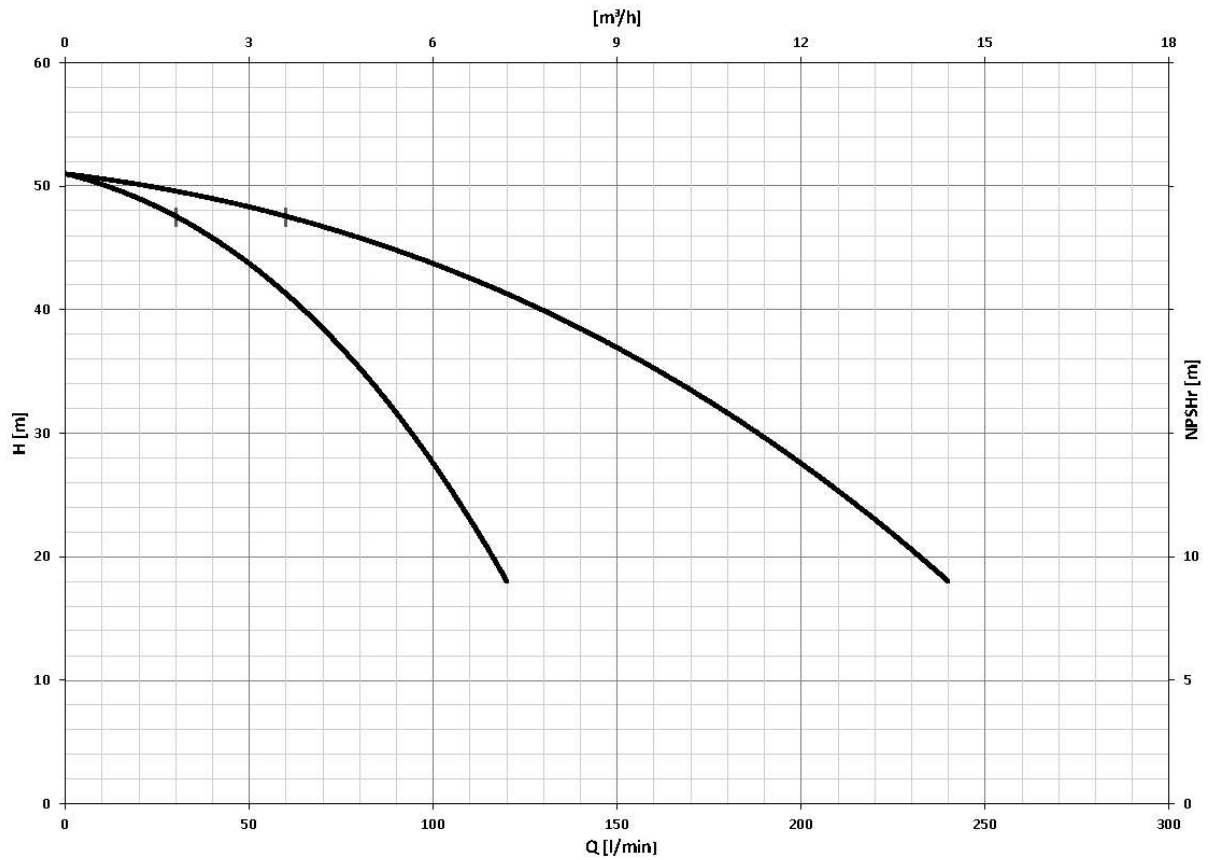
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2GP(E) COMPACT B/12(M)

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PERFORMANCE CURVE

50_{Hz}

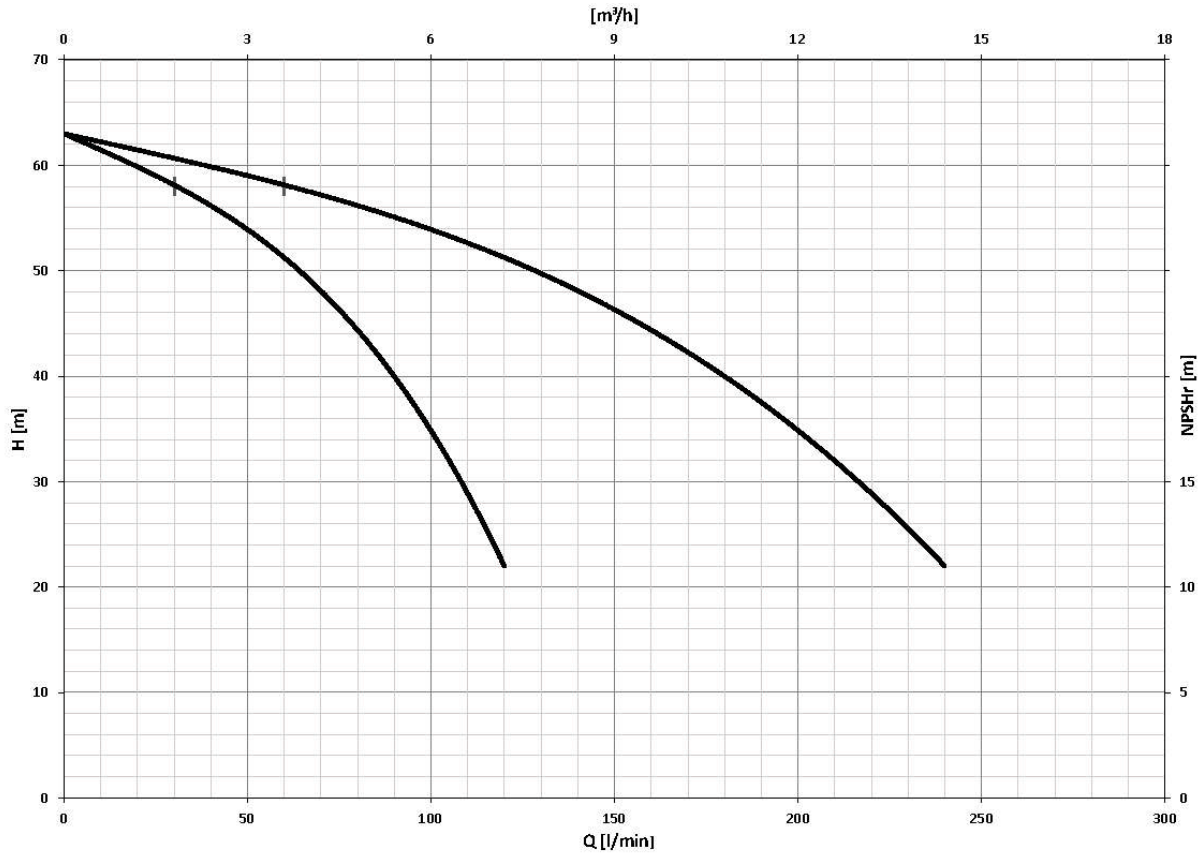
PERFORMANCE CURVE

GP-GPE

5

2GP(E) COMPACT B/15(M)

PERFORMANCE CURVE



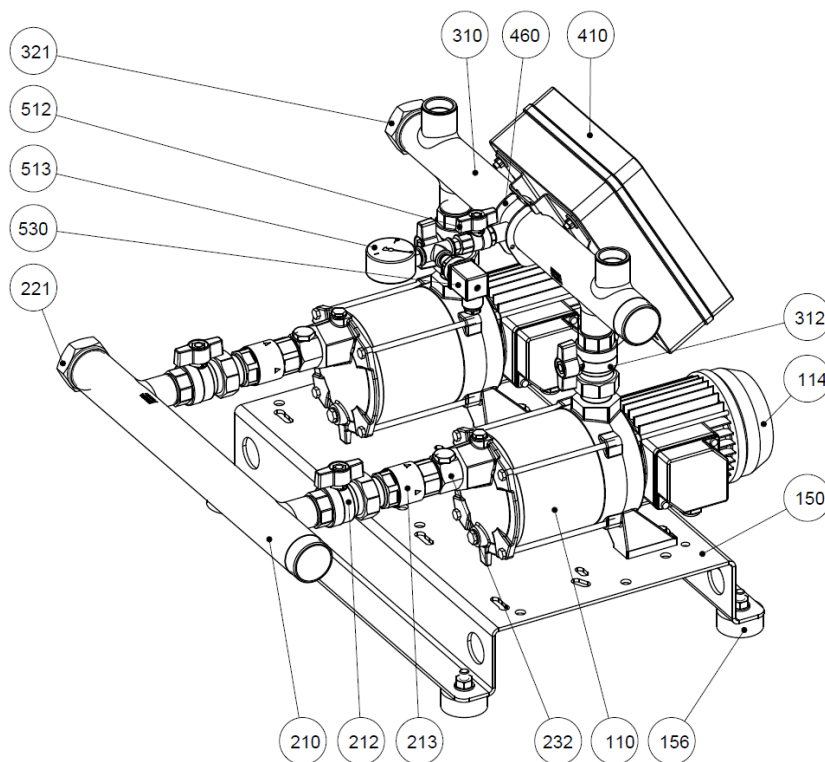
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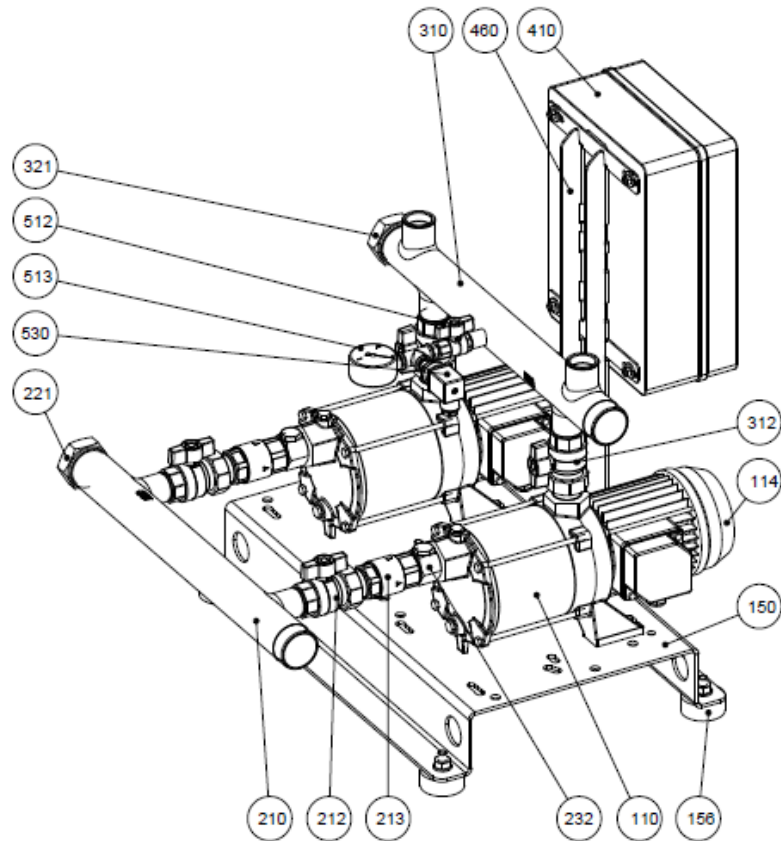


2GP CONSTRUCTION EXTERNAL VIEW 2GP COMPACT SINGLEPHASE



N°	PART NAME	MATERIAL	Quantity
110	Principal pump	-	2
114	Electric motor	-	2
150	Basement	Galvanized steel	1
156	Basement foot	SBR	4
210	Suction manifold	AISI 304	1
212	Union ball valve	CW617N / CW614N	2
213	Check valve	Brass / NBR	2
221	Threaded female cap	Galvanized steel	1
232	Nipple for air feeders	Yellow brass	2
310	Discharge manifold	AISI 304	1
312	Union ball valve	CW617N / CW614N	2
321	Female cap	Galvanized steel	1
410	Control panel	-	1
460	Control panel frame	Galvanized steel	1
512	Ball valve	CW617N / CW614N	1
513	Pressure gauge	Copper alloy / plastic	1
530	Pressure Transmitter	-	1

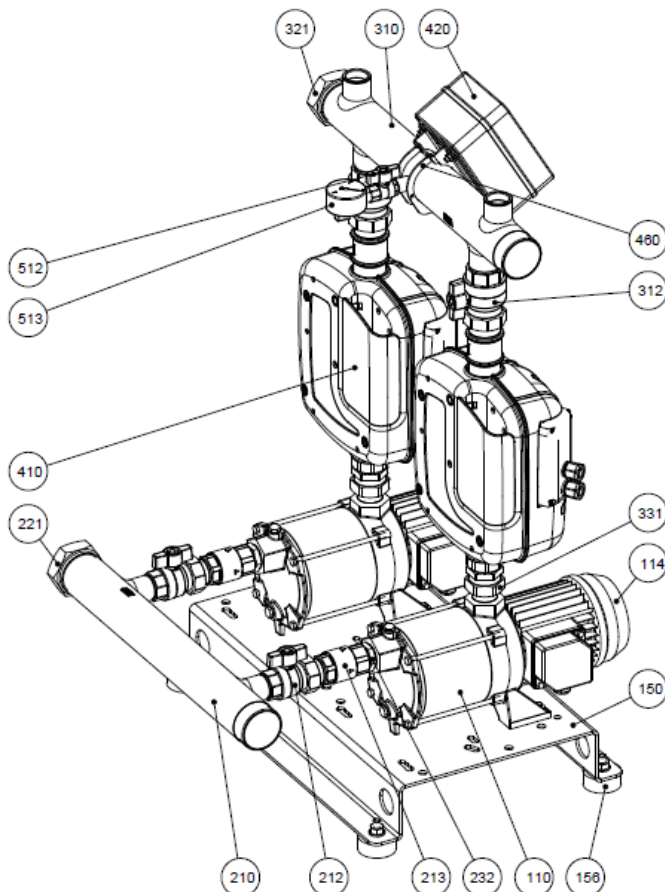
EXTERNAL VIEW 2GP COMPACT THREEPHASE



N°	PART NAME	MATERIAL	Quantity
110	Principal pump	-	2
114	Electric motor	-	2
150	Basement	Galvanized steel	1
156	Basement foot	SBR	4
210	Suction manifold	AISI 304	1
212	Union ball valve	CW617N / CW614N	2
213	Check valve	Brass / NBR	2
221	Threaded female cap	Galvanized steel	1
232	Nipple for air feeders	Yellow brass	2
310	Discharge manifold	AISI 304	1
312	Union ball valve	CW617N / CW614N	2
321	Female cap	Galvanized steel	1
410	Control panel	-	1
460	Control panel frame	Galvanized steel	1
512	Ball valve	CW617N / CW614N	1
513	Pressure gauge	Copper alloy / plastic	1
530	Pressure Transmitter	-	1

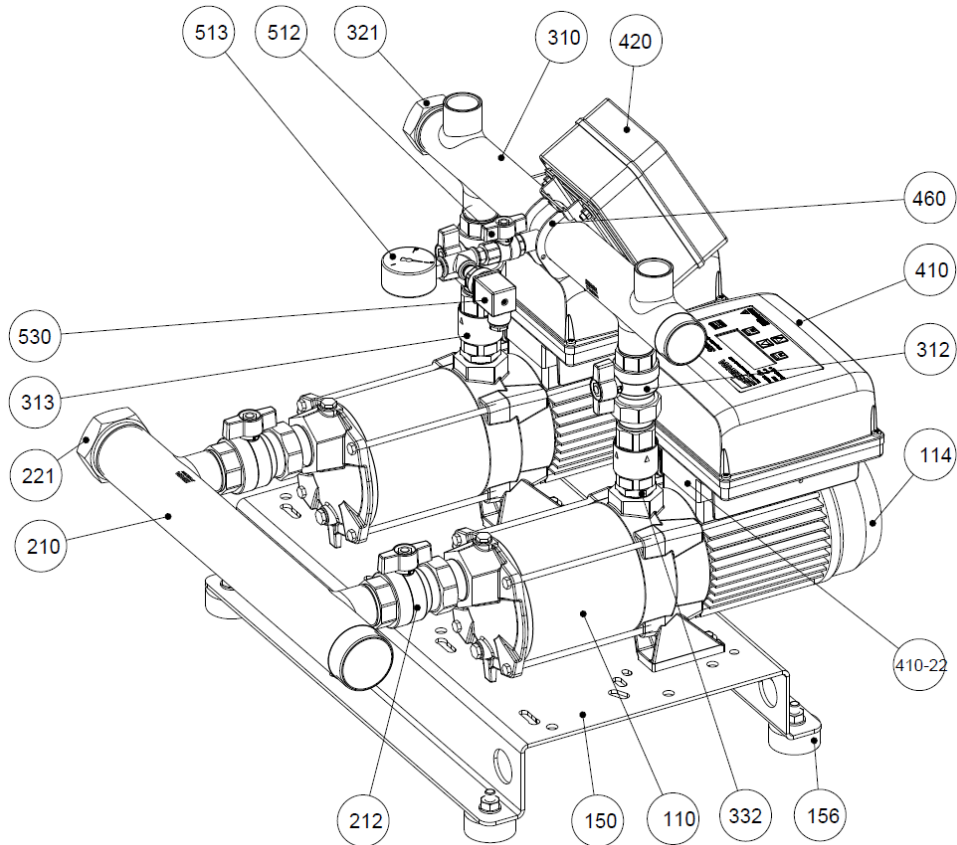
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2GPE CONSTRUCTION EXTERNAL VIEW 2GPE COMPACT E-POWER



N°	PART NAME	MATERIAL	Quantity
110	Principal pump	-	2
114	Electric motor	-	2
150	Basement	Galvanized steel	1
156	Basement foot	SBR	4
210	Suction manifold	AISI 304	1
212	Union ball valve	CW617N / CW614N	2
213	Check valve	Brass / NBR	2
221	Threaded female cap	Galvanized steel	1
232	Nipple	Yellow brass	2
310	Discharge manifold	AISI 304	1
312	Union ball valve	CW617N / CW614N	2
321	Threaded female cap	Galvanized steel	1
331	Union 3 pcs.	Yellow brass	2
410	E-power	-	2
420	Protection panel	-	1
460	Protection panel frame	Galvanized steel	1
512	Ball valve	CW617N / CW614N	1
513	Pressure gauge	Copper alloy / plastic	1

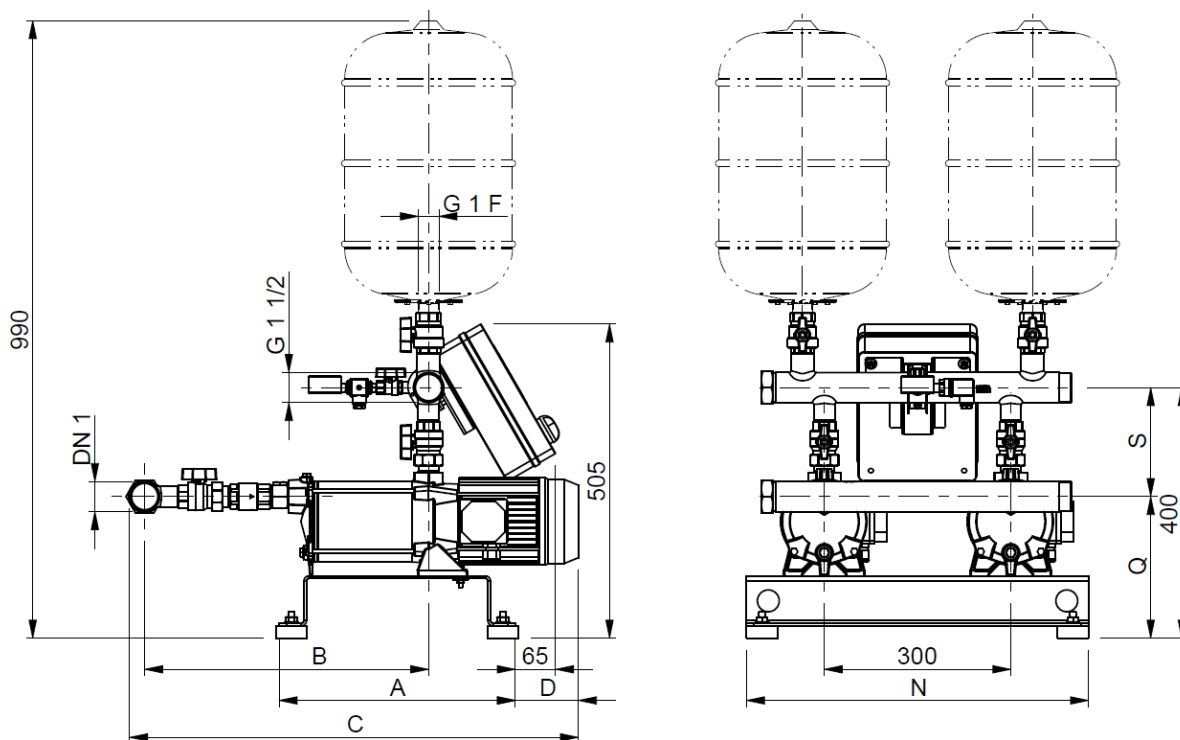
EXTERNAL VIEW 2GPE COMPACT E-SPD



N°	PART NAME	MATERIAL	Quantity
110	Principal pump	-	2
114	Electric motor	-	2
150	Basement	Galvanized steel	1
156	Basement foot	SBR	4
210	Suction manifold	AISI 304	1
212	Union ball valve	CW617N / CW614N	2
221	Threaded female cap	Galvanized steel	1
310	Discharge manifold	AISI 304	1
312	Union ball valve	CW617N / CW614N	2
313	Check valve	Brass / NBR	2
321	Female cap	Galvanized steel	1
332	Nipple	Yellow brass	2
410	E-SPD	-	2
410-22	E-SPD adaptor	-	2
420	Protection panel	-	1
460	Control panel frame	Galvanized steel	1
512	Ball valve	CW617N / CW614N	1
513	Pressure gauge	Copper alloy / plastic	1
530	Pressure Transmitter	-	1

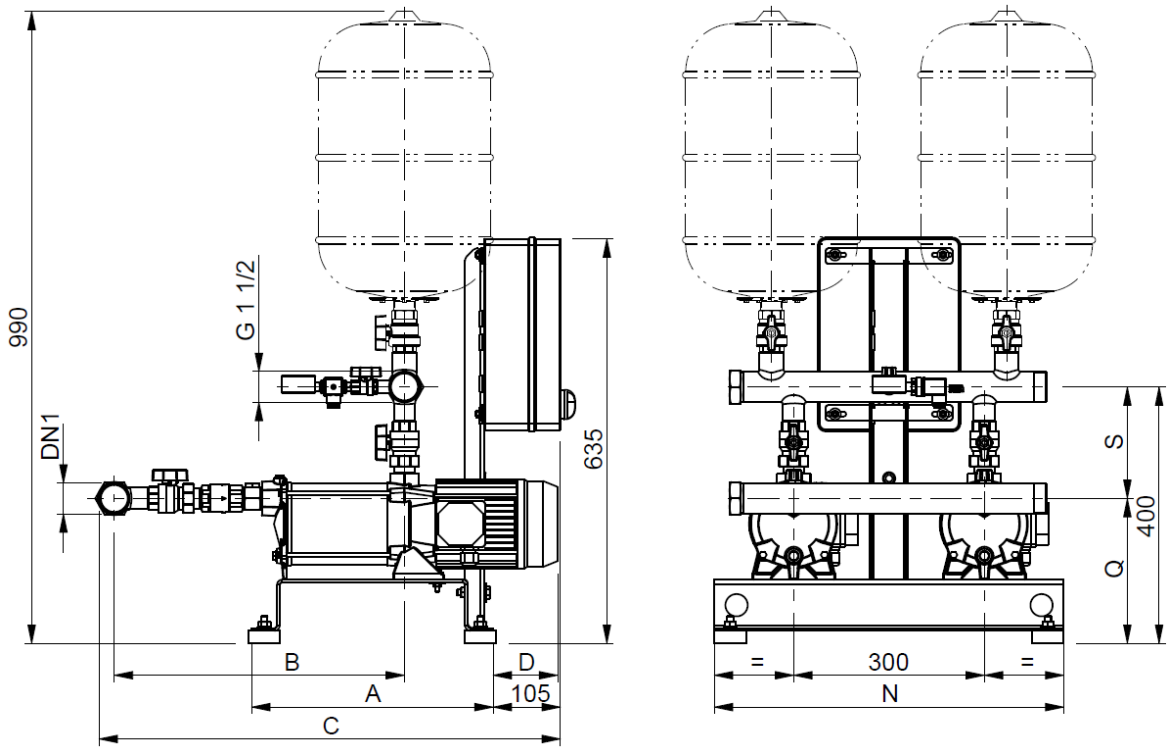
604

OVERALL DIMENSIONS 2GP BOOSTER SET 2GP COMPACT SINGLEPHASE



Booster Type	Dimensions [mm]								Weight [kg]
	DN1	A	B	C	D	N	Q	S	
2GP COMPACT A/8M	G 1 1/2	380	405	635	50	550	230	175	51
2GP COMPACT A/10M	G 1 1/2	380	430	685	90	550	230	175	59
2GP COMPACT A/12M	G 1 1/2	380	455	720	100	550	230	175	61
2GP COMPACT A/15M	G 1 1/2	540	485	745	60	570	230	175	64
2GP COMPACT B/12M	G 2	380	435	705	100	550	225	180	62
2GP COMPACT B/15M	G 2	380	460	730	100	550	225	180	64

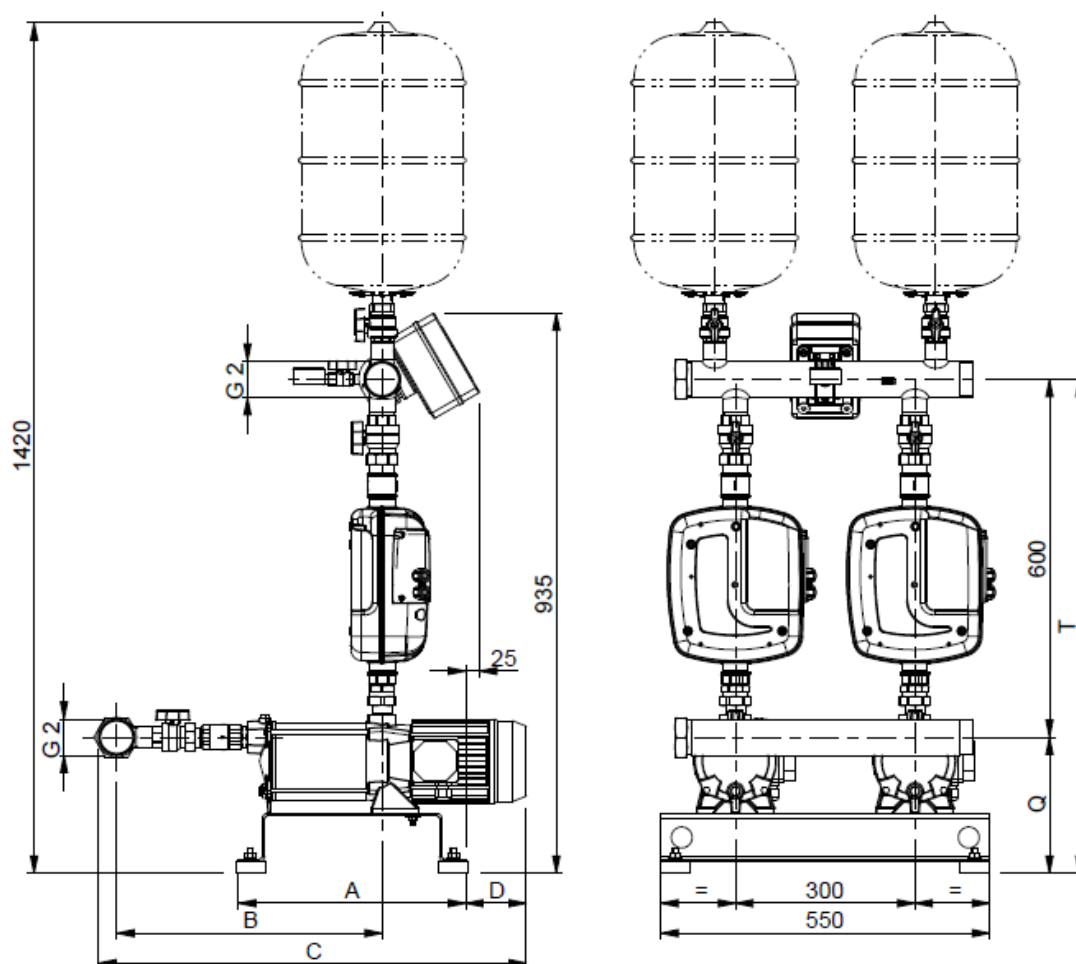
2GP COMPACT THREEPHASE



Booster Type	Dimensions [mm]								Weight [kg]
	DN1	A	B	C	D	N	Q	S	
2GP COMPACT A/8	G 1 1/2	380	405	705	50	550	230	175	53
2GP COMPACT A/10	G 1 1/2	380	430	725	90	550	230	175	61
2GP COMPACT A/12	G 1 1/2	380	455	725	100	550	230	175	65
2GP COMPACT A/15	G 1 1/2	540	485	785	60	570	230	175	66
2GP COMPACT B/12	G 2	380	435	710	100	550	225	180	66
2GP COMPACT B/15	G 2	380	460	735	100	550	225	180	66

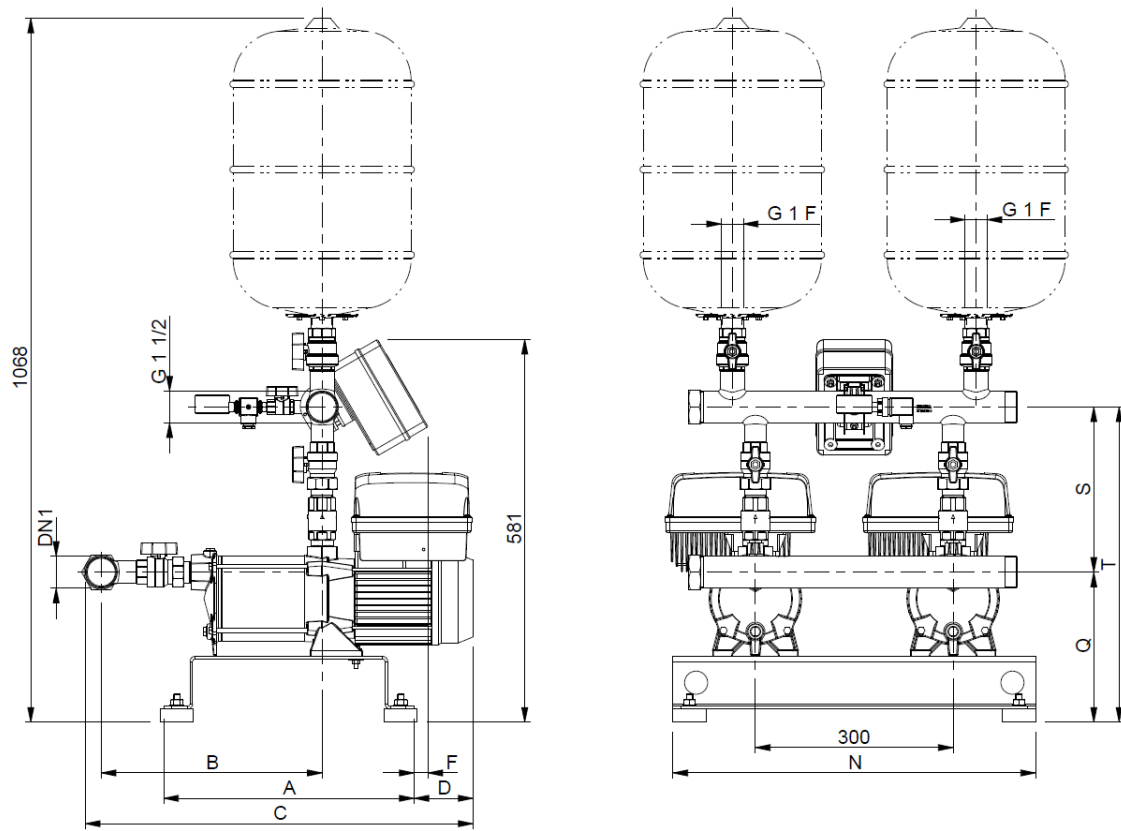
OVERALL DIMENSIONS 2GPE BOOSTER SET

2GPE COMPACT E-POWER



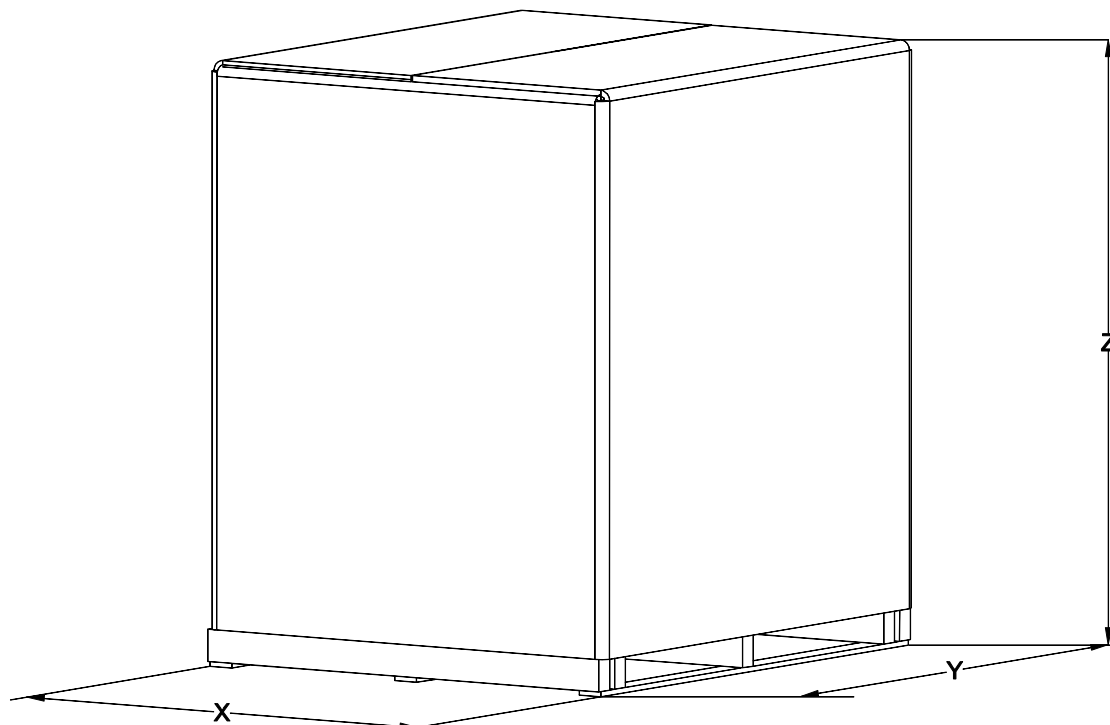
Booster Type	Dimensions [mm]						Weight [kg]
	A	B	C	D	Q	T	
2GPE COMPACT A/8 EPW	380	390	610	50	230	830	56
2GPE COMPACT A/10 EPW	380	420	675	90	230	830	64
2GPE COMPACT A/12 EPW	380	445	715	100	230	830	68
2GPE COMPACT A/15 EPW	540	470	740	70	230	830	69
2GPE COMPACT B/12 EPW	380	415	685	100	225	825	68
2GPE COMPACT B/15 EPW	380	440	710	100	225	825	68

2GPE COMPACT E-SPD



Booster Type	Dimensions [mm]										Weight [kg]
	DN1	A	B	C	D	F	N	Q	S	T	
2GPE COMPACT A/10 ESPM	G 1 1/2	380	335	588	90	21	550	228	251	478	54
2GPE COMPACT A/12 ESPM	G 1 1/2	380	361	626	102	21	550	228	251	478	57
2GPE COMPACT A/15 ESPM	G 1 1/2	540	387	652	72	-	570	228	251	478	65
2GPE COMPACT B/12 ESPM	G 2	380	330	601	102	21	550	224	255	479	57
2GPE COMPACT B/15 ESPM	G 2	380	356	627	102	21	550	224	255	479	58

PACKING



	Booster type	Overall dimensions packing				Booster+packing Weight [kg]
		X	Y	Z		
				1~	3~	
2GP	2GP COMPACT A/8(M)	690	890	780	930	78
	2GP COMPACT A/10(M)					86
	2GP COMPACT A/12(M)					90
	2GP COMPACT A/15(M)					91
	2GP COMPACT B/12(M)					91
	2GP COMPACT B/15(M)					91
2GPE EPW	2GPE COMPACT A/8 EPW	690	790	-	1215	81
	2GPE COMPACT A/10 EPW					89
	2GPE COMPACT A/12 EPW					93
	2GPE COMPACT A/15 EPW					94
	2GPE COMPACT B/12 EPW					93
	2GPE COMPACT B/15 EPW					93
2GPE E-SPD	2GPE COMPACT A/10 ESPM	690	890	780	-	81
	2GPE COMPACT A/12 ESPM					84
	2GPE COMPACT A/15 ESPM					92
	2GPE COMPACT B/12 ESPM					84
	2GPE COMPACT B/15 ESPM					85

INTENTIONALLY EMPTY PAGE

CONTROL PANEL FIXED SPEED

2 EP-E SPECIFICATION

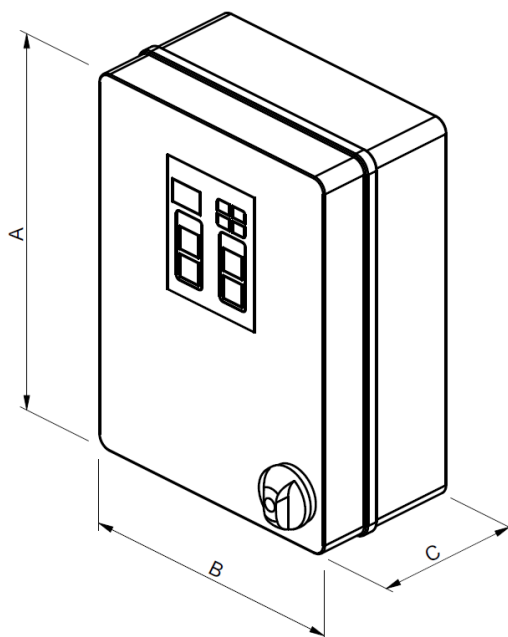
- **SERIES 2EP-E M UA (single-phase power output)**
- **SERIES 2EP-E T UA (three-phase power output)**

Electrical panel (protection and control) for two electropumps. Manual or automatic operation through pressure transmitter or/and pressure switches. The panel is configured to start the two pumps alternately in stand-by to pressure transmitter or/and pressure switch. The electrical panel protects the motors against overload and phase failure. Any protection devices that intervene are signalled on the panel itself and remotely through no voltage contacts. The protection device against overload and phase failure resets automatically three times, and manually after the fourth intervention.

TECHNICAL FEATURES

- P.MIN= Operation against dry running (tripped by a level float or minimum pressure switch) with automatic reset once water supply is restored, with warning lamp.
- TRP= control by pressure transmitter
- PR1= Pump n. 1 start/stop (not included in the pressure set)
- PR2= Pump n. 2 start/stop (not included in the pressure set)
- Automatic start sequence alternation
- Motor protection against overload with automatic reset for three times and manual reset the fourth time
- Motor line protection against short-circuits with fuses for motor startup
- Transformer and auxiliary circuit protection with fuses
- Remote signalling, through NC-NO no voltage contact, of the protection devices that intervene

Version		2EP-E M UA	2EP-E T UA
Power source	Frequency	50/60 Hz	
	Phase	Single-phase	Three-phase
	Voltage	230 V ± 10%	400 V ± 10%
	Power	0.55 ÷ 2.2 kW	1.1 ÷ 7.5 kW
Others	Protection degree	IP 56	
	Ambient Temperature	-10°C + 50°C up to 7.5 kW	
	Pressurisation units	2 pumps	
	Relative humidity	50% a 40°C MAX (90% a 20°C)	
	Max altitude	1000 m (a.s.l.)	
Directives	2014/35/EU (LVD), 2014/30/EU (EMC), 2011/65/EU (RoHS)		



2EP-E M UA MODELS TABLE

Model	Single pump Power [kW]	I Calibration [A]	Motor fuse	Dimensions AxBxC [mm]	Weight [kg]
2EP-E 0,55 M	0,55	2x4,5	6A aM (10x38)	240 x 190 x 90	1,5
2EP-E 1,1 M	1,1	2x9	10A aM (10x38)	240 x 190 x 90	1,5
2EP-E 1,5 M	1,5	2x12	12A aM (10x38)	240 x 190 x 90	1,5
2EP-E 2,2 M	2,2	2x15	20A aM (10x38)	300 x 220 x 120	2,2

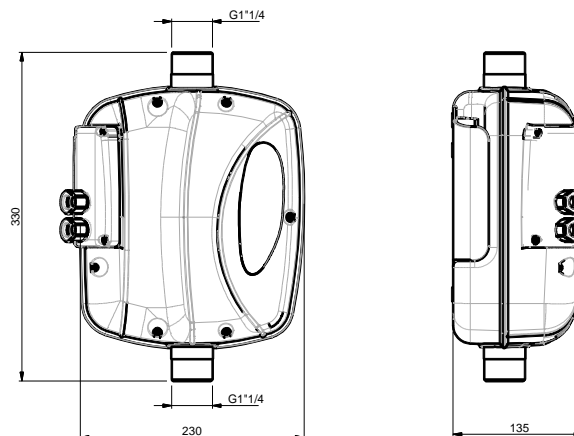
2EP-E T UA MODELS TABLE

Model	Single pump Power [kW]	I Calibration [A]	Motor fuse	Dimensions AxBxC [mm]	Weight [kg]
2EP-E 1,1 T	1,1	2x3.5	4A am (10x38)	300 x 220 x 120	3,5
2EP-E 2,2 T	2,2	2x5	8A am (10x38)	300 x 220 x 120	3,5
2EP-E 4 T	4	2x9	12A am (10x38)	300 x 220 x 120	3,5
2EP-E 7,5 T	7,5	2x15	20A am (10x38)	300 x 220 x 120	3,5

CONTROL PANEL VARIABLE SPEED E-POWER SPECIFICATION

In-line electronic device for controlling electropumps, employing inverter technology. Starts and stops the pump and modulates the speed of the motor in relation to the water demand on the system, to maintain the operating pressure setting. Provides excellent comfort for the end user, significant energy savings and increased service life, the typical advantages of inverter controlled autoclave systems. E-power use the Master/slave mode that allows to connect two inverters on the same system in order to improve its performance in a coordinate mode. The connection for this mode is made by communication line ON/OFF.

E-POWER MT		
Power	Power Voltage	Single-phase 230 V
	Output Voltage (pump)	Three-phase 230 V
	Phase current	Max 10 A
	Output frequency	5 ÷ 60Hz
	Maximum pump power	2.2 kW
Others	Pressure setpoint	0.3 ÷ 8 bar
	Max overpressure	12 bar
	Protection degree	IP 65
	Ambient Temperature	0 ÷ 40°C
	Liquid temperature	+1 ÷ 40°C
	Liquid type	Water with no chemical add (ph 5÷9) and no debris
	Pressurisation units	2 pumps
	Hydraulic Connection	G1"1/4 Male
	Weight	2 kg
	Protection	Dry-running Over/under voltage Short-circuit Overload Overtemperature Low pressure Pressure sensor fault
Directives	2014/35/EU (LVD), 2014/30/EU (EMC), 2011/65/EU (RoHS)	

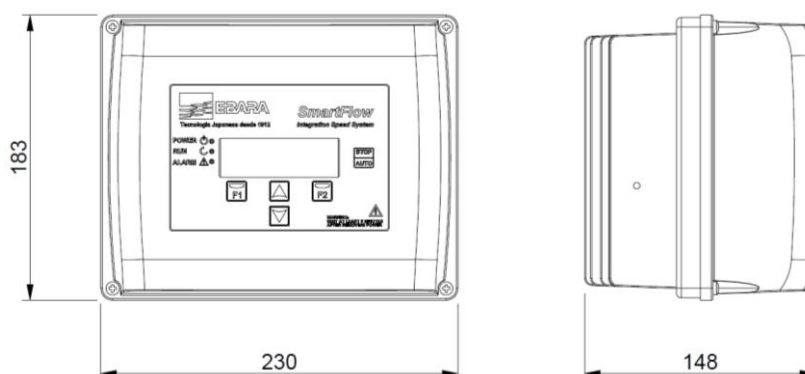


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E-SPD SPECIFICATION

In-line electronic device for controlling electropumps, employing inverter technology. Starts and stops the pump and modulates the speed of the motor in relation to the water demand on the system, to maintain the operating pressure setting. Provides excellent comfort for the end user, significant energy savings and increased service life, the typical advantages of inverter controlled autoclave systems. E-SPD is an inverter that could be installed on the terminal box. It can be adapted on horizontal and vertical pumps. E-SPD can protect the system against overpressure, overcurrent, voltage fluctuation, dry run and water leak. The connection for this mode is made by communication line ON/OFF.

E-SPD				
Power	Version	MT	TT	
	Power Voltage	Single-phase 230 V	Three-phase 400 V	
	Output Voltage (pump)	Three-phase 230 V	Three-phase 400 V	
	Output frequency	50 ÷ 60Hz		
	Maximum pump power	2.2 kW	4 kW	
	Max I in	20 A	12 A	
	Max I out	11 A	11 A	
Others	Pressure setpoint	0.5 ÷ 25 bar		
	Protection degree	IP 55		
	Ambient Temperature	-10 ÷ 40°C		
	Pressurisation units	2-3 pumps		
	Weight	2,7 Kg		
	Protection	Dry-running		
		Over/under voltage		
		Short-circuit		
		Overload		
		Overtemperature		
Low pressure				
Pressure sensor fault				
Directives	2014/35/EU (LVD), 2014/30/EU (EMC), 2011/65/EU (RoHS)			



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EBARA Pumps Europe

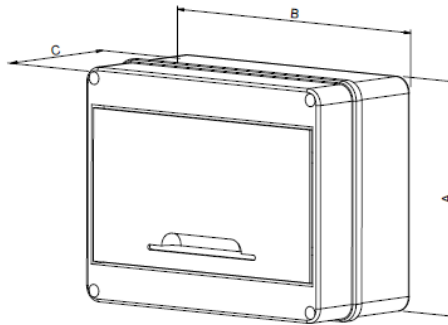
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PROTECTION PANEL SPECIFICATION

Connection box for inverter :

- Connects the inverters with the power supply point.
- Equipped with circuit breakers on individual lines

Power source	Frequency	50/60 Hz	
	Phase	Single-phase	Three-phase
	Voltage	230 V ± 10%	400 V ± 10%
	Power	0.37 ÷ 3 kW	0.37 ÷ 15 kW
Others	Protection degree	IP 55	
	Ambient Temperature	-5°C + 40°C	
	Pressurisation units	2 pumps	
	Relative humidity	50% a 40°C MAX (90% a 20°C)	
	Max altitude	1000 m (a.s.l.)	
Directives	2014/35/EU (LVD), 2014/30/EU (EMC), 2011/65/EU (RoHS)		



Model	N° Pumps	Power [kW]	Dimensions A-B-C [mm]	Max Current [A]
PROT 2E-DR 1.5-3M	2	2x3	160x120x90	2x20
PROT 2E-DR 4T		2x4	160x200x90	2x16
PROT 2E-DR 5.5T		2x5.5	160x200x90	2x20
PROT 2E-DR 7.5T		2x7.5	160x200x90	2x25
PROT 2E-DR 15T		2x15	160x200x90	2x32
PROT 3E-DR 1.5-3M	3	3x3	160x120x90	3x20
PROT 3E-DR 4T		3x4	200x250x110	3x16
PROT 3E-DR 5.5T		3x5.5	200x250x110	3x20
PROT 3E-DR 7.5T		3x7.5	200x250x110	3x25
PROT 3E-DR 15T		3x15	200x250x110	3x32



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